The strictly attractive 1/*12* interaction between steps of crystal surfaces

Abstract

Using SSH model for the step structure of crystal surfaces, a strictly attractive $1/l^2$ energy, which originates from the quantum effect of surface atoms' collective relaxation, was obtained for the first time and shown to generally exist between steps. The repulsive $1/l$ step interaction was confirmed to come from the surface electrons' interaction. These results are crucial for understanding the dynamics of steps and for reconciling the dilemma associated with the equilibrium crystal shape of gold crystallites.